

Inventor: BUTTLE ET AL
Serial No.: 10/562,148
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Examiner: LEDYNH, BOT L
Group Art Unit: 2862

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Amendments to the claims:

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This listing of claims replaces all prior versions, and listings, of claims in the application:

7. (Currently amended) A method for monitoring a flexible elongate structure with a generally cylindrical surface, the structure comprising at least one layer of steel wires near the cylindrical surface, the steel wires extending at least partly along the length of the structure, the method comprising inducing an alternating magnetic field ~~much less than saturation~~ in the steel wires using at least one electromagnetic probe adjacent to the cylindrical surface of the structure, the or each probe incorporating an electromagnetic coil to induce the said alternating magnetic field, and monitoring the alternating magnetic flux density near the cylindrical surface of the structure in the vicinity of the said probe, determining from the monitored flux density a corresponding parameter indicative of stress in the steel wires, detecting a position at which the stress in the wires is significantly less than at other positions, and hence detecting if any wires have broken.

8. (Previously presented) A method as claimed in claim 7 wherein the magnetic field is in a direction at a non-zero angle to the longitudinal axes of the wires.

9. (Previously presented) A method as claimed in claim 7 wherein the magnetic flux monitoring means forms part of the probe.

10. (Previously presented) A method as claimed in claim 9 wherein the measurements are made using an array of said

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electromagnetic probes around the circumference of the structure.

11. (Previously presented) A method as claimed in claim 7 wherein the method comprises resolving signals from each magnetic monitoring means into an in-phase component and a quadrature component, and deducing from the in-phase and quadrature components a stress-dependent parameter that is independent of lift-off.

12. (Previously presented) An apparatus for monitoring a flexible elongate structure with a generally cylindrical surface, the structure comprising at least one layer of steel wires near the cylindrical surface, the steel wires extending at least partly along the length of the structure, the apparatus comprising at least one electromagnetic probe adjacent to the cylindrical surface of the structure, the or each probe incorporating an electromagnetic coil to induce an alternating magnetic field in the steel wires, and means for monitoring the alternating magnetic flux density near the cylindrical surface of the structure in the vicinity of the said probe, and means for determining from the monitored flux density a corresponding parameter indicative of stress in the steel wires, and hence for detecting if any wires have broken.